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ABSTRACT

The adoption of philosophy into the public school curriculum has been advocated on the grounds that it improves students' creativity and basic academic skills. That "philosophy for children" programs can have such an impact on children should be of no surprise to students of John Dewey. Although John Dewey did not directly advocate implementing a "philosophy for children" curriculum, it does seem that he was proposing that it should occur. To understand the world of the scientist is, for Dewey, to employ conceptual tools as a scientist employs them and to avoid the egotistical Gestalt idiosyncrasies of non-scientists or young children. Not much has been done to initiate children into the self-conscious practice of seeing the world as a scientist sees it. Education has done little to free students of over-simplified images of scientific practice. If children are to gain any real sense of what it is to "do science," they must first philosophize about the scientist's use of certain inferential techniques and all that follows from the use of such decision-making practices. Not only science education, but all discipline-oriented curricula can be similarly enhanced by making philosophy a part of every public school curriculum program. (Author/RH)

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The State of a "New" Art: Philosophy for Children and Science Education

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Advocates of philosophy for children programs have urged the adoption of philosophy into the public school curriculum on the grounds that it can increase students' sense of creativity[1] and basic academic skills.[2] Matthew Lipman reports a number of test studies indicating that students experience increased competency in such traditional subjects as mathematics and reading subsequent to the study of philosophy.[3] Gareth Matthews along with Lipman and many others have testified to the impact philosophic study seems to have on children's imaginative impulses.[4] That philosophy for children programs can have such a dramatic impact on children should be of no surprise to students of John Dewey for as Dewey so poignantly writes, "Learning is the proper sense, is not learning things, but the meanings of things. . ."[5] While it is the task of the various sciences to study things as they are, it is clearly a philosophic task to determine the meanings that various things have for us--or at least, the meanings they ought to have. For our experience of the world to amount to something more than the interface which occurs between our sensory receptors and the world of material objects, some process of reflection must take place. And, as Dewey again points out, this process necessarily involves, ". . .the use of signs, or language in its generic sense."[6] The process by which a person assimilates sense datum into conscious

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experience may happen so rapidly that the person is unaware of the occurrence of any interpretive activity at all. Yet as Wittgenstein, Hanson and Kuhn have all pointed out in their discussions of the famous duck/rabbit experience, a learned pattern of interpretation does determine that our experience of the duck/rabbit figure will be one of seeing the figure as a rabbit or a duck or a line of certain proportions. In any case, when one sees the figure as something, one imports meaning to the gross presentation of sense datum. And, as noted above, Dewey correctly notes that the ability to import meaning to sense datum is always a learned response. Now determining how people have come to import meaning X to sense datum Y may well be a matter for psychological study, but to determine what meaning ought to be assigned to sense datum Y is clearly a matter for philosophic study. Again, Dewey, Wittgenstein, Whorf, Sapir and many others have reminded us that how the world appears to each of us is largely a function of the conceptual apparatus with which we address the immediate presentation of sense datum. While some philosophers may lament that we are irretrievably bound to accept whatever ways of worldmaking that have become for us habitual, Dewey, like Nelson Goodman, recognizes that the way out of this house of conceptual mirrors is through philosophy. Specifically, Dewey writes, ". . . philosophy is a critique of prejudices. . . If they are not detected they often obfuscate and distort. Clarification and emancipation follow when they are detected and cast out; and one great object of philosophy is to accomplish this task."[7] Here we find Dewey echoing Wittgenstein's dictum that, "Philosophy is a method of investigation". But unlike Wittgenstein, Dewey does not regard philosophy as a sort of anthropology of concepts, but rather as a study which elucidates both how our conceptual world is presently furnished and how it ought to be furnished. The criterion to be employed in

determining how one ought to furnish one's own world is the pragmatic criterion of access. In other words, to what extent does one set of signs, symbols, inferential routines, and accompanying ontological commitments give us greater access to thinking about the objects in the world around us as opposed to some alternate set of proposals. Dewey, as well as his successor W. V. O. Quine have each recognized that in practice it is extraordinarily difficult to identify one set of signs, symbols, inferential routines and ontological commitments as superior to competing sets. In any case, Dewey precisely describes the task at hand particularly as it applies to education in general as follows, "The difficulty lies in making over habits that have to do with 'ordinary affairs and conveniences' into habits concerned with 'precise notions'. The successful accomplishing of the transformation requires (a) enlarging the pupil's vocabulary, (b) rendering its terms more precise and accurate, and (c) forming habits of consecutive discourse." [8] In short, if a student is to free him or herself from inhibiting conceptual prejudices, and, if the student is to understand the world in a pragmatically sound fashion, then as I understand the point of Dewey's recommendations, students should be engaged in philosophic activity.

While I am certainly willing to admit that Dewey did not once advocate the implementing of a philosophy for children curriculum, it does seem that in nearly everything he did say about education, he was proposing that it should occur in a sound and genuinely philosophical manner. Perhaps it would be best at this point to illustrate my claim through an extended example.

Dewey had a particular interest in philosophy of science. Indeed, as a pragmatist Dewey had a deep concern with showing how the statements of a scientist deserved more serious attention than the conjectures of an ordinary layperson. For example, in Essays in Experimental Logic, Dewey boldly declared that, "Controlled inference is science, and science is, accordingly,

a highly specialized industry."[9] And, a little later in that same essay Dewey noted that, "Non-scientific modes of practice, left to their natural growth, represent, in other words, arrangements of objects which cluster about the self, and which are closely tied down to the habits of the self. Science or theory means a system of objects detached from any particular personal standpoint, and therefore available for any and every possible personal standpoint."[10] Dewey thought that science represented a very special way of addressing the material world. To understand the world of the scientist is, for Dewey, to see the world as a scientist sees it, to employ conceptual tools as a scientist employs them and to avoid the egoistical gestaldt idiosyncrasies of non-scientists or young children. Thus, if a child is to learn science he or she must self-consciously enter into and take part of a scientist's way of addressing the world. This does not involve something as mundane as the "learning by doing account" educators often attribute to Dewey, subsequent to reading his, The Child and the Curriculum: The School and Society,[11] rather it involves getting children to become self-conscious of their own thinking processes and then getting them to become conscious of and conscientious about using the inferential routines of scientists in the appropriate situations. This attention to the practice of systematic inference-making will not frustrate the development of imaginative or creative impulses in children for as Dewey insists, "Inferential inquiry in scientific procedure is an adventure in which conclusions confound expectations and upset what has been accepted as facts."[12] Thus, facility with the inferential routines of science will result in children taking even greater delight in their thinking about the world.

Unfortunately, it has been my experience that not much has been done in our country to follow Dewey's advice and initiate children into the self-conscious practice of seeing the world as a scientist sees it. Instead,

children are too often just told about the scientist's world or the "facts" that populate it. This is particularly regretful since we seem now to be living at a time when there is much popular interest in the goings-on in the world of science. Such interest is evidenced in the fact that television shows such as Carl Sagan's "Cosmos" and CBS's "Discovery" have achieved so much attention in prime-time ratings and from the press. In addition, there are now a number of commercial magazines such as Science Digest, Discover, Science 81, and so on whose sole focus of reporting is the most recent achievements of science. Although these magazines provide the layman with a record of recent scientific achievements, I am afraid that they do little to promote an understanding of how science happens. The journalistic accounts that are presented in these tabloids foster an impression amoung casual readers that science is a process whereby practicing scientists simply move from discovery of one new fact to the discovery of additional and even grander facts about the world in which we live.

I am afraid that education has done little to free students of this misleading and over-simplified picture of scientific practice. Engineering students I have talked with in my philosophy of science class indicate that they see science as the process whereby new truths are regularly established, and which will never again be open to question. Similarly, teachers - even science teachers - I have talked with in the schools or in my class on philosophy of education seem equally willing to write science off as simply a matter of "basing one's conclusions on the evidence". Without a much more thorough explanation of what is involved in "basing one's conclusions on the evidence", it is not at all clear just what this practice of science amounts to or what inferential routines are to be favored or avoided in

addressing whatever it is that we are counting as evidence. To say that science is a matter of "basing conclusions on the evidence" is at best a trivial truth, and at worst it may just be dead wrong.

To illustrate this point consider the following example. With the exception of perhaps the most arrogant of positivists, archaeology is regarded by scientists as a genuine and characteristic science. Consider then what it is that an archaeologist qua archaeologist does such that his professional activity is distinguishable from that of non-scientists such as bankers, police officers and teachers. At a large dig, the archaeologist may have employed a dozen or so ditch diggers to begin excavating. During the course of the dig-site activities on any one given day the archaeologist may remain in his or her tent, plotting graphs, assembling laboratory equipment, and generally doing whatever it is that an archaeological project manager does in such circumstances. While the archaeologist is away from the dig site, suppose one of the ditch diggers uncovers an ancient artifact. Certainly the fact that a person is a ditch digger is no reason to conclude that such a person is wholly inept at making inferences. Consequently, upon uncovering an artifact, it would not be surprising to hear the ditch digger remark,"I bet a Roman General drank out of this."

Now the ditch digger's conclusion, as indicated by his remark above, is based solely on his discovery of the artifact. In short, the ditch digger has based his conclusion upon new evidence that he personally discovered. Nevertheless, few lay persons and even fewer scientists would be willing to regard the ditch digger's remark as the conclusion of a scientist. Yet, if the archaeologist who subsequently received the artifact, concludes that it was probably a part of the personal belongings of Mark Anthony, we do tend to give special regard to the archeologist's utterance, and we do count

it as the product of scientific activity. What then do we consider to be the significant difference between the statement of the ditch digger and the subsequent though similar statement of the scientist. Although both statements represent conclusions grounded upon an identical item of evidence, the scientist brings a whole wealth of scholarship to bear upon his inference-making processes. However, as Dewey pointed out, simply knowing more than some other person surely is not sufficient grounds for identifying the more knowledgeable person as a scientist.

For example, we might imagine that our ditch digger in the example above is an underemployed English professor whose specialty is the work of William Shakespeare. Now if one were to take all the information to which the ditch digger/scholar is privy and all the information to which the archaeologist is privy and program each set of information into a computer, it may turn out that the information index of the Shakespearean scholar/ditch digger contains more entries. Hence, simply knowing more than others is not sufficient grounds for identifying scientists as opposed to lay persons. In fact, one may be a scientist and know less in general than other non-scientists within one's immediate proximity leaving us with the perhaps bewildering question, "What is it that makes a scientist a scientist?".

This is precisely the question I have often posed to fourth through sixth grade students when I introduce them to the philosophic study of science. You will recall from the discussion above that Dewey put much emphasis on getting children to be aware of the roles played in our thinking by various signs, symbols, inferential routines and ontological commitments. And, you may recall further that, even in Dewey's own terms this seems to be the essence of "doing philosophy." Consequently, if one is to have students philosophically investigate the idea of science and similarly of being a

scientist in light of the example given above, then students must be asked to consider the entire range of epistemically relevant features which constitute scientific practice. This involves far more than noting the claims of scientists or drawing children's attention to the extent of the scientist's previous knowledge. If children are to understand what it means to engage in scientific activity then explicit reference must be made to specific epistemic features entailed in individual examples of scientific decision-making. As Dewey so often notes, it just will not do for the novice to know only the signs and symbols of science.[13] Rather, the student must also become familiar with the inferential routines employed by scientists within a particular domain and the ontological commitments which accompany the use of such routines.

Specifically, when discussing these matters with elementary school age children I often ask them to consider Dewey's analogy between being a scientist and being a blacksmith.[14] As I alluded to above, to teach only the signs and symbols employed by scientists will not provide the student with an understanding of what it is to do sciences. Similarly, knowing the names of each of the blacksmith's tools provides the student with no understanding of the technique through which such tools are most efficaciously employed. To understand the work of either a blacksmith or a scientist, one must understand the techniques employed by each in carrying out their respective tasks. Whereas the techniques of the blacksmith are primarily psychomotor, the techniques of greatest importance to the scientist are purely epistemic. Thus, if the children are to gain any real sense of what it is to "do science" they must first philosophize about the scientist's use of certain inferential techniques and all that follows from the use of such decision-making practices.

Once children philosophize about epistemic freatures of decision-making in a particular domain of scientific practice no grand leap of faith is required on their part to understand how a scientist's approach to the world may be quite different from that of the non-scientist. In the case of the archaeological example, I have found that children are typically quick to reason that what makes the archaeologist's conclusion qualitatively different from that of the ditch digger is not just greater background knowledge on the part of the scientist or even his social role as an authority on such matters. Rather, the archaeologist's conclusion differs from that of the ditch digger because the archaeologists is able to give a formal account of his decision, detailing inferences from background knowledge and the sense datum experience to a conclusion that would be accessible to all practitioners of the archaeologist's craft. Again, by asking children to reconsider Dewey's blacksmithing analogy, children easily come to recognize that while a non-blacksmith may ultimately find a way to keep an iron shoe on the hoof of a horse, the fact that the non-blacksmith was able to produce an end-product roughly similar to that of the blacksmith is not sufficient evidence to conclude that the non-blacksmith now has an understanding of how to practice the craft of blacksmithing as a blacksmith does. Similarly, just because a ditch digger and an archaeologist report the same conclusion is not sufficient evidence to conclude that they have produced the same intellectual achievement. The children routinely observe that just as the non-blacksmith may get a rough fit between the horse's hoof and the iron shoe, the non-blacksmith's technique was most probably inept and surely could not be counted on in the future. Similarly, the ditch digger's elicitation of a conclusion roughly similar to that of the archaeologist, was bereft of the inferential techniques of scientific practice and even if

approximately true in the case at hand such techniques are flimsy at best and cannot be relied upon in the future.

The archaeologist example and the subsequent analogy of the blacksmith represent but two instances in which philosophic study can contribute to a child's understanding of scientific practice. I could easily mention many other philosophical investigations that can similarly contribute to a child's understanding of "doing science", but time will not permit such a proliferation of examples. Suffice to say that not only is philosophic study an asset in getting children to understand science, it is essential if that understanding is to be at all authentic.

At the beginning of this paper, I reported that my contact with engineering students, education majors and even prospective science teachers has led me to conclude that there are too few people who understand the essential nature of scientific practice - or at least scientific practice as Dewey understands it. I see only one solution to this problem and that is to engage students at all levels in the philosophic study of scientific practice. I am not advocating that philosophic study of scientific practice should replace experimental work in the laboratory or even the memorization of a scientific vocabulary. A comprehensive science education requires all that we are presently doing for students through laboratory work, vocabulary development and didactic instruction in the achievements of science, but to that it is essential that we add philosophy if we expect our students to not just know about science but what it is to <u>do</u> science. My own work in engaging children in the philosophic study of science has shown me time and again that students not only become more sensitive to the epistemic features of scientific practice but that they delight in learning to see science not as a dull finite set of routines and facts, but rather as a dynamic aspect

of human existence.[15]

Other than theology and perhaps pure mathematics, philosophy spawned all other academic disciplines, and it remains a most interested parent. Every academic discipline engages in research and every method of research remains open--and, indeed, invites--philosophic debate and study. In short, philosophic study remains an integral part of each and every academic discipline. Consequently, not only science education, but all discipline-oriented curriculums can be similarly enhanced by initiating children into relevant philosophical experiences. Philosophy for children is a very old idea. The most astonishing thing about philosophy as a contemporary curricular practice is that it had to be re-born again through the efforts of Matt Lipman and his colleagues. When and why philosophy disappeared from the curriculum remains a mystery. Certainly in the philosophic community students of Dewey and Wittgenstein should equally have been committed to preserving the philosophic component in education at all levels. Perhaps as current philosophic interests became more esoteric and educators became more awed with the apparent objectivity of behavioral psychology and the technologies of standardized testing, philosophy came to look too much like an intellectual dinosaur in the modern curriculum. In any case as philosophy is again showing itself to be an important part of the curriculum, not just as an adjunct for improving imagination and general thinking skills, but as a vehicle for displaying in turn, the essential nature of each academic discipline, it is imperative that we do all we can to make philosophy a part of every public school curricular program.

References

1. See for example, Paul A. Wagner, "The Elusive Notion of Creativity," The Clearing House, January, 1982. pp. 204-205.

2. See for example, Paul A. Wagner, "Philosophy in Mathematics Education." Metaphilosophy, forthcoming, 1982.
Paul A. Wagner and Terry Ten Brink, "Philosophy for Children and Language Arts Education," Journal of Thought, Vol. 14, No. 2, April, 1979. pp. 114-121

3. Matthew Lipman, et.al., Philosophy in the Classroom. (Philadelphia: Temple University Press, 1980). Appendix B.

4. Gareth Matthews, Philosophy and the Young Child. (Cambridge: Harvard University Press, 1981).

5. John Dewey, How We Think. (Chicago: Henry Regnery Company, 1933), p. 236

6. Ibid.

7. John Dewey, Experience and Nature. (New York: Dover Puvlisher, 1958), p. 37.

8. John Dewey, Essays in Experimental Logic. (New York: Dover Publisher, 1916.) p. 435.

9. Ibid., p. 446

10. Ibid., p. 435

11. John Dewey, The Child and the Curriculum: The School and Society, (Chicago: University of Chicago Press, 1956), p. 139-140.

12. Dewey, Essays in Experimental Logic, p. 442.

13. John Dewey, The Quest for Certainty, (New York: G. P. Putnam's Sons, 1929), p. 185

14. Dewey, Essays in Experimental Logic, p. 435

15. See for example, Paul A. Wagner, "Philosophy Children and 'Doing Science'", Thinking, Vol. I, No. 1, January, 1979, pp. 55-57; "Metatheoretical Aspects of Science and Science Education of the Future," Education A Time For Decisions, K. Redd, Ed., (Washington: World Future Society, 1981, pp. 240-247; "Philosophic Inquiry and the Logic of Elementary School Science Education." Science Education, Volume 61, No. 4, Fall, 1977, pp. 549-558; "Physics, Logic and Philosophy for Children," Kappa Delta Pi Record, Vol. 18, No. 2, Winter, 1982, pp. 57-59.